N.A.C.A. BULLETIN

In Two Sections

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AN INCENTIVE PLAN FOR CHAIN STORES
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EDITORIAL DEPARTMENT NOTE

The profits of a business may be increased by increasing prices, increasing volume, decreasing costs, or by some combination of these. In many lines volumes are at an all-time high and the prospect of further increase is not too bright. On the other hand, prices have already been increased to the point of arousing increasing consumer resistance. There is, therefore, only one method left for increasing profits—cost reduction. This is no easy task, but our first article contains a variety of helpful hints.

THOMAS D. FOY, its author, was born in Pittsburgh, Pa., but received his early education in Glasgow, Scotland. His entire business career has been with the General Electric Co., where he has risen to his present post of Supervisor of Cost Reduction for the Apparatus Division of the entire company.

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Most of us have become somewhat smug about the subject of inventory valuation. We are apt to think we know it all. Our second article should therefore be an eye opener. Valuing inventories in flour mills is of course a specialized subject; what starts out as a fairly simple condition rapidly evolves into a highly complex situation.

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The third article presents a rather unusual incentive plan. Although it is intended to apply to chain store managers, it is possible that with suitable modifications it might be applied to other situations. The plan takes into account four factors tending to promote the financial soundness of the business and rewards the manager on the basis of his achievement in each of these, rather than selecting only one of the factors.

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COST REDUCTION

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EMPHASIS upon the increased cost of production is tremendously significant because it places in its proper light the only way that progress can be made—through cost reduction. It is a positive approach which offers the way to survival of a business rather than a mere recital of obstacles to smooth sailing. It is likewise an attitude which faces the facts rather than passes the responsibility to the shoulders of labor or government or any other handy scapegoat while the business dies of its own internal disease. And this viewpoint also reveals the broad nature of the activity, for success can occur only when vision is widened sufficiently to realize that cost reduction involves every phase of the business. A program for improving a business cannot be one which jabs here and there in hit-or-miss fashion; instead, it must be an all-inclusive operation designed to let some air out of the cost balloon rather than to push at one spot of a sealed one. We must go to work on every phase of the business in our efforts to obtain lower costs with resultant lower prices to customers, a fair return on the investment of the owners, and high employee morale.

The Present Situation

Management has just awakened from a dream, a pleasant dream in which competition was practically dead, and profits, although reduced by renegotiations and taxes, were still far from unsatisfactory. However, while dreaming so pleasantly, our houses were becoming more and more cluttered with inefficiencies which were so great that any comparison with predream days surely awakens us with a bang. Unfortunately the picture is not a pretty one, but fortunately its grimness is realized. Described as briefly as possible, the picture reveals a spread between cost and selling prices which is so narrow, despite unprecedented production, that there is no room for carelessness and waste.

The question immediately arises—what can be done about it? The easy way out is to raise prices, but a moment's reflection on the effect of such a policy brings out its obvious danger to the nation as well as to the individual business. The conclusion should

not be drawn that price increases are never necessary. The point is that price increases should be resorted to only after it has been clearly proven that costs are as low as possible consistent with sound business practice. It takes hard work to learn the answer to this fundamental problem and the easy escape is to forget it. But to your business increased prices may mean eventual bankruptcy by inviting competition; to your nation, increased prices mean still greater inflation and may eventually bring a depression. In short, cost reduction is the key to continued prosperity under a rising standard of living and, if this conclusion is correct, the present situation calls for immediate action.

Where are Excessive Costs?

Locating the excessive costs is the easiest part of our task, for excessive costs are to be found in every element, that is, material, labor, and overhead. A few examples will make this clear. As to material, excessive costs lie in the use, so to speak, of gold when tin will do the job as well or better. They also occur in purchasing procedures, such as the failure to take advantage of quantity discounts and the placement of large quantities of small orders. Material waste has likewise grown through poor material utilization, despite a critical material shortage which in itself should be sufficient to put us on our toes, quite apart from the cost factor.

Regarding labor, the losses from spoilage and extra work continue to climb, poor planning and scheduling of operations continue to occur, and supervision needs still more education.

As to indirect expense, which is in effect indirect labor and material, the inefficiencies are so many and varied that it is a waste of time to recite them. But one should be mentioned—paper work! Many of us are involved in some sort of expansion of our business in which we are replacing outmoded factory machines and manufacturing processes with equipment that will increase production and lower cost. How many of us are replacing outmoded clerical operations with the same zeal and energy?

These examples could be multiplied ad infinitum. They are sufficient, however, to reveal the tremendous opportunities for cost reduction, and what is even more important, every one of the evils mentioned cannot be blamed solely on the war, organized labor, or the government. This lack of a scapegoat is fortunate, for it then becomes clear that the responsibility for doing something about excessive costs rests in the hands of individuals like ourselves.

Whose Job Is Cost Reduction?

From the partial recital of excessive costs it is clear that every part of the organization is involved in this problem. In the course of his regular duties almost every employee has something to do with the cost of products and at times can make important contributions to cost improvement. The engineers who conceive the design and the draftsmen who work out the details are continually influencing cost. Every time a material specification is added to a drawing or a material list is prepared, it is in effect an order for material. Every time a dimension is put on a drawing labor must be applied. The planners who plan the shop work, the groups that order materials and control the inventory, the people who design the tools or purchase the shop equipment, and the foremen who supervise the production, all have a marked influence on the ultimate cost of the product. Therefore, it is essential that each group within the company recognize its responsibility in this matter and that every individual strive to improve cost.

Organization for Cost Reduction

In view of the fact that the cost reduction problem permeates every part of the business, it is clear that a cost reduction organization must be broad so that as many employees as possible will be able to contribute. Now the setup in any specific company depends upon a number of things, such as the divisional organization, the type of product, the size of the division, and the personnel available. Most of the actual cost reduction work must be done by the line organization in the engineering and manufacturing divisions. Nevertheless, a functional setup for coordinating purposes is often desirable. One means of accomplishing this result is through a cost reduction committee responsible to the division head and including representatives of engineering, manufacturing, and cost. If the size of the manufacturing division does not warrant a committee, the function can be followed by one man. Supplementing the cost reduction committee, there may be one or more specialists covering cost reduction projects, manufacturing losses, expense reduction, or other related activities. Regardless of the specific type of organization, however, experience indicates that the effectiveness of the organization depends primarily upon the type of men selected as leaders in the cost reduction activity. Without question, the best qualified men in a division should be given

this responsibility. It may often be desirable for these men to perform other duties, but their work should be arranged so that an appreciable part of their time and effort can be devoted to cost improvement. The individuals chosen should have a good working knowledge of the product manufactured, the manufacturing equipment, and the production control system. They should have organizing ability and be able to obtain the help and cooperation of the entire organization in completing projects rapidly.

To summarize, the cost reduction organization should be based on the following essentials:

1. Capable men in the manufacturing and engineering organizations spending sufficient time on the activity.
2. An organization set up so that these men can work as a team.
3. Continuous education of the entire organization by the executive, technical, and supervisory groups.
4. That definite objectives be established.
5. That results and progress be measured currently.
6. That the organization be continually stimulated to better performance.

Method of Attack

Fundamentally, a cost reduction can be accomplished when a way is found to produce a given result at less cost. A successful program must be based on the principle of obtaining many ideas, sorting out those that are practical, and putting them into effect as quickly as possible. Such a program might involve these steps:

1. Getting the facts.
2. Analyzing the facts and getting ideas.
3. Deciding the course of action.
4. Allocating the responsibility to some individual or individuals to see that it is carried out.
5. Follow-up.

By way of illustration, let us assume that we are a cost reduction committee about to make a review of the costs of a specific piece of apparatus whose profit is unsatisfactory. Hence, the selling price and the manufacturing cost must be learned. Next, a detailed analysis is necessary in order to find the items of high cost. We also want complete information concerning the design of the device, such as drawings, specifications, etc., and, if size

permits, an actual sample. The work of collecting the data and putting them into form ready for analysis is, of course, best done under the direction of the cost man on the committee. After the complete facts pertaining to the device have been obtained the next step is to analyze them in order to see how the costs can be improved. At this point there must be an abundance of ideas and so it is extremely helpful to have on the committee individuals representing engineering, manufacturing, planning, production, and cost.

Perhaps one of the best tools for cost analysis is comparison. To make comparisons possible certain things should be determined about the piece of apparatus under study, such as:

How much does it weigh?
What does it cost per pound?
How many parts has it?
How long does it take to produce?
How far does it travel in the course of manufacture?
How many labor operations are there?

These evaluations can then be compared to evaluations of similar items being manufactured.

Use of Check List

Still another approach can be used. It has been found valuable in reviewing designs for cost reduction purposes to have a check list of points to consider. For instance, in reviewing the cost of a given casting the following points might be considered:

1. Possibility of eliminating baked sand cores.
2. Multiple patterns instead of single patterns.
3. Metal patterns instead of wood patterns.
4. Permanent molds instead of metal patterns.

In the final analysis, however, the need for high quality personnel requires emphasis, for they will be able to use good judgment in their analysis and quickly find what accounts for the high costs. Comparisons and check lists are useful tools but they are no substitute for good judgment.

To accomplish any difficult task it is necessary to have a definite objective. This is especially true of cost reduction work. In deciding upon the ideas or projects to put into effect for the device being studied, it is necessary to know what these projects should

save in dollars and cents. These proposed savings should definitely be made a matter of record and set up as bogeys against which to measure actual results later. It should also be decided when the bogey should be accomplished.

Responsibility for working out the cost reduction projects falls upon the line organization. Therefore, each project should be assigned to that person in the organization who is best fitted to put it into practical use. This allocation of responsibility is very important because in this way interest is maintained and the program carried through.

Follow-up for completion is the task of some member of our cost reduction committee who has enough time to take care of it properly. It need not be more than a simple system of logging the cost reduction projects and seeing that they are carried to a conclusion.

Timing the Cost Reduction Program

The timing of the cost reduction program can best be described by considering, first, new products not yet in production; second, standard devices already in production; and third, individual orders for special equipment.

The best time to make a cost reduction review is when a new piece of apparatus is in the design stage. If considerable thought is given to the cost of the product at that time, it will pay large dividends later. This should be done before tools and fixtures are ordered, materials are purchased, and orders released for manufacture.

Although the best place to make cost reduction is on new products before they are released, it does not mean that the process should stop at that point. New and better tools are constantly becoming available, new methods appear every day, and new materials are always being introduced. Therefore, to keep the cost of our products in line, regular reviews of standard products are essential.

Unless they are of sufficient magnitude to warrant such a review, individual orders for special nonstandard products do not lend themselves to complete cost reduction study. Therefore it is necessary to take them as they arrive and work rapidly, more or less hitting the high spots. In working on this special apparatus, one way of avoiding the restrictions imposed by limited time is to work out a long range program of cost reduction of basic designs from

which the special equipment can be made. Such a program tends to standardize parts and intricate units which, in itself, usually results in lower costs.

Reduction of Indirect Labor Expense

Simplification of Organization and Routines

Up to this point, emphasis has been placed on the direct elements of cost. Let us now consider the reduction of indirect expense.

The essential features of a good organization are simplicity and definiteness of allocation of responsibility. The number of top supervisors should be the practical minimum, and their jobs and responsibilities, as well as the jobs and responsibilities of their subordinates, should be clearly defined. Duplication or overlapping of responsibility generally gives rise to inefficiency and sets the stage for "passing the buck." In expense reduction work, one should constantly be on the lookout for possible simplification in organization and for conditions where duplication or overlapping of responsibility exists.

Closely allied to the above are the simplification and standardization of routines. To insure adequate service to customers and proper control of operations, definite routines for doing business are necessary. They must be designed to eliminate useless operations or duplication of operations which entail unnecessary expense.

Elimination of Activities

Conditions continually arise that justify the establishment of a a new activity. Such conditions are frequently temporary but it is not uncommon for the special activity to be perpetuated long after the need for it has disappeared. Under this heading may come such activities as special inspection setups, special reports of any character, and abnormal material-handling requirements.

All activities, and particularly those not a part of regularly established routines, should be reviewed frequently and critically. Sometimes some particular portion of an organization is built up to compensate for weakness or failures in other parts. If such a solution of a problem is permitted to exist for any considerable length of time it becomes easy to think of it as a normal procedure, whereas the proper long-term solution is to correct the original weakness. Though "crutches" may be necessary temporarily, they should not be allowed to become a permanent part of the setup.

Material Handling

Even if the organization is right, the allocation of responsibility is proper, routines are standardized and as simple as possible, and there are no unnecessary activities, there is always room for improvement of both factory and clerical methods. For example, material handling and storage constitute a big problem in any factory. These are influenced by plant layout and machine and stock-room arrangement. Receiving stations and raw material stock rooms should be as near as possible to the manufacturing areas. Machines should be so arranged that the movement of material between successive operations is minimized. Conditions where unbalanced flow of material is likely to cause congestion and rehandling should be corrected. The next consideration is the physical means of handling the material. New and improved material handling equipment is constantly being made available and presents opportunities for cost reduction.

Other Improvements

Clerical methods are subject to improvement as evidenced by the application of accounting machines, duplicators, electrically operated typewriters, etc. As in manufacturing operations, so in clerical operations there is always a better and cheaper way. Again, it is not possible to generalize on what is the best method of performing a given clerical operation. The essential thing is to study in detail the requirements of the job and then adopt that method which is the least costly and yet is satisfactory.

Sometimes there is no alternative to overtime work, but frequently overtime is necessitated because at some earlier period in the manufacturing process the scheduled dates of completion were not met. The lost time is made up through overtime work but at a fifty per cent increase in labor cost. Proper scheduling of production and strict adherence to schedule are together the key to control and to reduction of overtime premium payments.

Experience has proved that the establishment of standards always leads to greater labor efficiency and reduced labor costs. The comparison of actual performance with standards affords the supervisor an appraisal of employee effort and efficiency. There are many expense jobs of a routine or repetitive character for which standards could be set advantageously.

Reduction of Maintenance

Maintenance is a relatively large element of manufacturing expense. The field covered by maintenance varies all the way from replacing a window pane to overhauling a large boring mill. Regardless of the nature of the work to be done, there are two common-sense rules to be followed in reducing maintenance material and labor cost. The first is to reduce the necessity for maintenance and the second is to reduce the time required to do the jobs that are really necessary.

The necessity for maintenance may be reduced by proper construction, selection, care, and use of equipment. This involves several fundamental points:

1. Employees should be thoroughly instructed in the proper use and the value of the equipment which they operate.
2. Systematic inspection of all equipment by qualified individuals will reveal minor defects, wear, and weathering which should be reported promptly. This phase of maintenance may well be called preventive maintenance and simply recognizes the truth of the trite but expressive adage, "A stitch in time saves nine."
3. Maintenance records should be kept in such form that analyses can be made for the purpose of discovering and eliminating chronic troubles. It may be desirable in some cases to remodel or replace certain equipment that proves costly to maintain.
4. All machine equipment requires a certain amount of care so that it will continue to function properly. This is another form of preventive maintenance and is best handled by a qualified mechanic whose job it is to lubricate, clean, adjust, and make minor repairs to the machines and tools under his care.

An adequate program of preventive maintenance will minimize costs. However, there will always be regular and emergency maintenance work to do. Our aim should be to do this necessary maintenance at the minimum cost for material and labor.

Reduction of Indirect Material Expense

Nondurable Tools and Shop Supplies

Nondurable tools are small tools that are used and consumed in

the manufacturing process. Typical examples are files, hammers, reamers, drills, cutters, etc. Shop supplies are miscellaneous supplies required in the shop, such as gloves, goggles, lubricating oils, cleaning compounds, etc. There are two ways of reducing this expense, (1) by using fewer tools and shop supplies, and (2) by using less costly items.

An analysis of tool expenditures will indicate possible points of attack. Following are some of the possible causes of excessive costs which should be checked and corrected if necessary.

1. Untrained operators.
2. Improperly ground tools.
3. Improper or no lubricant or coolant.
4. Improper feeds and speeds.
5. Improper type of tool.

Conservation of Supplies

Expenditures for supplies, such as steam, electric energy, compressed air, water, gas, etc., represent an appreciable portion of expense. Some of these items are generated, that is, manufactured within the plant, while others are purchased from outside sources. The quantity consumed is the cost factor that all of us can influence and is, therefore, the factor we will discuss.

Steam is used for heating, for certain manufacturing processes, and for generating power. Heat is lost through:

1. Steam leaks.
2. Improper functioning of heating system.
3. Windows and doors left open unnecessarily.
4. Overheating of buildings.
5. Maintaining comfortable temperatures during idle periods.
6. Heating entire buildings because of requirements of certain areas.
7. Infiltration of air through cracks.

The steps to be taken to reduce these heat losses are obvious.

Steam used in manufacturing processes is frequently a relatively large item of cost in operations such as cleaning, plating, drying, baking, etc. This can be minimized by:

1. Proper instruction of operators.
2. Consolidating and scheduling loads in ovens, tanks, etc.
3. Adequate insulation of equipment.

4. Reduction of valve leaks during idle periods by using two valves, one for throttling and one for positive shutoff.

The expenditures for electric energy can be reduced by:

1. Controlling peak loads.
2. Turning off lights when they are not needed.
3. Consolidating and scheduling loads on electric ovens and furnaces.

Fixed Charges

Fixed charges represent a major item of indirect expense. This expense can be conceived of as the rental cost of grounds, buildings, and equipment. Contrary to popular conception, it is subject to control and reduction.

The time to control investments is before they are made. When a substantial expansion of a division is being contemplated, we should carefully and conservatively estimate the peak load likely to be reached and the duration of that peak load. If peaks are to be of relatively short duration, they likely can be handled more economically, in the long run, on an overtime basis. The expansion of facilities to handle temporary peak loads will result in low-average utilization of equipment and consequently a relatively high fixed charge. The capacity of a division should be held as near as practicable to the expected average load for the division.

Conclusion

It is obvious, of course, that these are only a few of the ways to reduce costs. However, it is hoped that enough has been said to indicate the method of approach to cost reduction. Cost accountants are vitally concerned with this problem and can contribute greatly to its solution. In spite of all the outward forces that may make the job difficult a challenge has been issued to show what can be done. Let us accept the challenge and show that the cost accounting profession can really contribute to achieving cost reduction.

VALUING FLOUR MILL INVENTORIES

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THE great majority of mills in the Kansas territory do not use any formal system of cost accounting. While certain of the larger mills do utilize cost accounting systems, only a few of the mills of Kansas make any particular attempt even to organize their accounting system and records in such a manner as to develop departmental data to show, for example, operating results of the grain, flour production, and feed production departments.

In view of these facts it seems advisable to discuss primarily certain factors relating to flour mill accounting which enter into the picture in all mills, large or small, those with relatively simple flour mill operations and those with a complex range of operations covering all phases of the grain and milling business, even in some cases impinging on the fields customarily considered as pertaining to other general classes of manufacturing.

Inventory Valuation

One such element is the valuation of inventories. The method normally used in the valuation of flour mill inventories involves numerous problems, some like but many unlike the problems arising in inventory valuation in other industries.

The majority of such problems arise from the nature of the commodity, wheat, which constitutes the basic raw material of the mill's operations. By its nature, wheat is a fungible, that is, a material the parts of which are interchangeable or capable of mutual substitution. Hence, any attempt to apply to wheat ordinary methods of inventory valuations based on the "lower of cost or market" principle would, except in very isolated cases, run into practically insurmountable difficulties. Even though market values were (under normal circumstances) readily obtainable, it would be practically impossible to determine the actual cost of the stock of wheat on hand, since the original source of the wheat on hand can rarely be determined. The wheat on hand at any time is usually a mixture of wheat acquired at many different times and in many different places. Thus there has developed in the milling industry a method of inventory valuation which has become quite generally

accepted in the industry. It is designed to reflect the values of the inventory elements of wheat and other elements related to wheat on a valuation basis which may be briefly described as a theoretical cost.

This method enters into the valuation of the following items of inentory:

1. Wheat.
2. Flour.
3. Feed.
4. Contracts covering future purchases or sales of all of three items just mentioned.
5. Transit tonnage inventories.

It does not apply to certain other inventory items, such as flour ingredients and flour and feed sacks, nor to the valuation of certain mill supplies, usually classed as deferred charges. The latter are normally valued at the lower of cost or market and in general present few problems in connection with their valuation.

To understand clearly the use of the theoretical cost basis of valuation of wheat and related items, it is perhaps advisable to outline briefly the normal procedures which are generally applied in a mill in relation to buying and selling wheat and its primary products, flour and feed.

At harvest time and continuing throughout the year, the mill purchases cash wheat supplies, either through its own country elevators or through grain dealers or terminal elevator companies. The wheat is brought to the mill plant and stored in its elevators. The amount of such wheat on hand at any time is, of course, limited by the mill's grain storage capacity. At all times the sales force of the mill is booking sales contracts for flour, some contracts for immediate delivery, with many other contracts calling for delivery at a set price at a time perhaps 60 to 90 days, or even longer, subsequent to the date of the sales contract. The price at which this flour is sold is based on wheat prices at the date of sale.

In many instances, the wheat required to produce the flour called for by sales contracts for future delivery is far in excess of the quantity of wheat which the mill is able to keep on hand in its grain storage facilities. To protect itself against losses which, in the event of an increase in wheat prices, would arise if it purchased the actual wheat at the date of grinding the flour called for by its sales contracts, the mill either contracts for future delivery of

wheat at a fixed price, based on the market price of wheat at the execution of the contract, or takes a long position in the wheat option market, buying options which are to be settled at a later settlement date. In some circumstances, of course, the mill's actual stock of wheat on hand may exceed the wheat requirement to fill its existing flour contracts, in which event the mill may protect itself by sales of options. By proper utilization of the facilities of the option market the mill is able, quite effectively, to protect itself against losses (or gains) from fluctuations in the market price of wheat. This is achieved by a quantitative balancing of the "long" factors of wheat on hand and of wheat covered by purchase contracts, against options bought to cover the "short" factors of the wheat required to fill flour sales contracts, contracts for the sale of wheat, and options sold. This is the usual situation, although it is true that in recent periods this procedure has been subject to considerable disruption due to suspension of option trading, government restrictions on quantity of flour which was permitted to be ground, and on the quantity of wheat permitted to be carried in inventories, as well as other factors.

Valuing Wheat Stocks

At the end of a month the mill accountant proceeds to figure inventories as follows: After receiving inventory quantities of physical items in the inventory, he recaps and classifies the items listed thereon into the various classifications used in pricing. Wheat is normally classified by grade and protein content, while the flour is classified into groups according to type. After this procedure, probably the first item to be valued will be the wheat.

In this territory the Kansas City grain market quotations normally furnish the basic market valuations upon which the inventory prices are based. The prices used in the valuation are in normal times readily available in the daily publication "The Kansas City Grain Market Review." The wheat stocks themselves are valued at the current market price, adjusted for price differences applying to the various grades and proteins of wheat. Since usually it is impossible to find prices on actual cash sales of wheat of all grades and proteins in the quotations given, it is customary to use the option price as a basis and apply to this the various protein premiums (or discounts) as published in a table in the "Grain Market Review." This table is, of course, based on the prices real-

ized on actual cash wheat sales which were made in the Kansas City market. From the prices determined in this manner, it is necessary to deduct the freight rate from the mill location to Kansas City, in order to obtain a price at the mill point. These prices are then applied to the wheat stocks on hand and an inventory value of wheat obtained.

Flour Inventories

The prices used in the valuation of flour inventories are based upon the inventory price which has been established for the wheat stock. Such wheat price per bushel for the type of wheat which was used to produce the flour to be valued is multiplied by the number of bushels required to produce one hundredweight of flour. Next there is added an amount representing the manufacturing costs of that particular mill per hundredweight (theoretically based on past costs of manufacturing but in many cases actually representing a more or less rough estimate) and from that total there is subtracted an amount known as a "feed credit."

This feed credit, which is also used in figuring flour prices for purposes of establishing price quotations to be used by the sales department, is intended to allow (as a credit against the flour price) the value of the mill feed produced in the course of manufacturing the flour. The value of this feed is, of course, determined by the price which may be obtained through sale of the feed. For a relatively long period mill feed had been selling at OPA ceiling prices, so it was customary to obtain feed prices for purpose of inventorying the feed stocks by using the Kansas City ceiling (which is a price per ton of feed in sacks) deducting freight from the mill to Kansas City and converting to a price per hundredweight. This gave a figure f.o.b. mill for sacked feed, which could be used as the inventory value of the feed on hand at the inventory date.

Feed Credit

To obtain the feed credit used in flour pricing it was necessary to deduct from this price of feed sacked f.o.b. mill the cost of the container, and convert the amount to that representing the quantity of feed which would be produced in the manufacture of a hundredweight of flour. For example, during the period when the government's 80 per cent flour extraction rule was in effect,

one hundredweight of flour was supposed to be produced from slightly less than 2.2 bushels of wheat. For convenience, 2.2 bushels was usually considered to represent the conversion factor, which would therefore result in 132 pounds of wheat when ground, producing 100 pounds of flour and 32 pounds of feed. On this basis, the price of bulk feed f.o.b. mill was multiplied by .32, the product representing the value of the feed which should be produced in the manufacture of one sack of flour. However, due to the vagaries of the feed market, which usually was subject to quite marked price fluctuations, it was customary to reduce the figure just obtained by a so-called safety factor before determining the amount known as "feed credit." The use of this safety factor is particularly important in the computation of the feed credit which is to be used in computing a flour price to be used by the sales department, since the feed resulting from the manufacture of the flour they might sell may not be produced for perhaps three months. The importance of this safety factor decreased after ceiling prices went into effect, but will probably increase in importance with removal of price controls.

Thus we see that the flour inventory price represents the wheat basis plus conversion cost, less feed credit. This is, of course, a bulk price of flour. If this bulk price is used, the sacks containing the flour inventory are added to the inventory of empty sacks and the total valued as sack inventory. Some mills follow this method. Other mills price their flour sacked, in which case the inventory value for bulk flour is adjusted for each type of container and the adjusted price for flour in any particular container applied to the part of the flour inventory packed in that manner. There is probably not any material difference in the totals of the flour and sack inventories computed under these two methods.

Theoretical Cost

From the discussion to this point it would appear that flour mill inventories are computed at market prices at inventory dates. However, certain other elements enter into the total inventory valuations, and when the results of these computations are included as parts of the total inventory valuation, the effect is to reduce the entire inventory to the theoretical cost basis previously mentioned.

These additional elements include the inventory adjustments arising from the treatments, for inventory purposes, of firm con-

tracts for future purchases or sales of wheat, flour and feed, and option contracts. In normal situations, the largest part of these adjustments is developed from computations relating to the unfilled flour sales contracts.

The theory of these adjustments, basically, is that a profit or loss element is computed, measured by the price difference between the wheat basis in these contracts (which are booked on the basis of the wheat price existing at the date the contract is made) and the market basis of wheat at the inventory date. The profit elements are treated as additions to, and the loss elements as deductions from, the inventory valuations of the physical stocks of wheat, flour, and feed.

Wheat Basis Profit or Loss

The mechanics of such a computation are relatively simple. The mill accountant prepares a list of the unfilled flour contracts, showing the hundredweights of flour undelivered on each contract and the wheat basis of this contract (the wheat price in effect at the date of the contract). Extensions of the unfilled quantities times the wheat basis are made. These extensions and the unfilled quantities of all open flour contracts are totalled and an average wheat basis of the open contracts computed. This average is compared with the market price of wheat and a profit or loss figure per bushel is found, a profit if the market price exceeds the average, a loss if the average exceeds the market price. The total hundredweights of flour in the open flour sales contracts are multiplied by the conversion factor (that is the bushels of wheat required to produce a hundredweight of flour) and that product further multiplied by the profit or loss per bushel, computed as just mentioned. The result of these computations is known as the profit or loss in wheat basis of unfilled flour sales contracts and is a positive element in inventory value if a profit, a negative element if a loss.

Hedging Wheat Purchases (Case I)

Similar computations are performed with respect to other types of open firm contracts for future purchases and sales. It is believed that, rather than going into the details of the mechanics of such computations, it will be of more value to give illustrations of a few situations showing how these adjustments to market valuations of physical stocks reduce the entire inventory to cost or a theoretical cost which quite closely approximates actual cost. To

make these illustrations relatively simple, we will have to work with hypothetical situations which would seldom if ever exist in such simplified form in actual practice. Also, in these illustrations we will assume that the markets are operating free of controls imposed from external sources.

For our first illustration let us assume that a mill owns 10,000 bushels of actual wheat, purchased May 1 at a cost of $1.70 per bushel, or a total cost of $17,000. Let us further assume that at the time of that purchase the mill had no open contracts of any type and had no other physical stocks of wheat or flour feed. Since by making this purchase they would thus be 10,000 bushels long, to hedge their position they sell 10,000 bushels of options on the Kansas City option market at $1.63. On inventory date the wheat market has advanced so that the mill's 10,000 bushels of wheat are valued at $1.76 per bushel or $17,600 for inventory purposes. This represents a six cents per bushel increase in the wheat price since the date of purchase and theoretically the option market should also have advanced about six cents or to about $1.69 per bushel. Therefore, at inventory date the mill would have a loss of six cents per bushel in its options, since if at that date they bought another 10,000 options to cover the 10,000 previously sold, they would have to pay six cents per bushel more. Thus, at inventory date this mill would have wheat valued at $17,600 and a net loss of six cents per bushel on 10,000 bushels of options sold, or $600. The net of these 2 elements is $17,000, which is the same as the original cost of the actual 10,000 bushels of wheat.

Case 2

As a second illustration we might consider a situation where a mill buys 24,000 bushels of wheat at $1.70 or a total cost of $40,800. At the same time they enter into a contract with a baker for the sale of 20,000 hundredweights of 80 per cent flour for future delivery, booked at a flour price based on wheat at $1.70. At a 2.2 conversion factor it will take 44,000 bushels of wheat to produce this flour. Thus, their wheat owned lacks 20,000 bushels of being sufficient to cover their requirements, so the mill buys 20,000 bushels of options at $1.63 to hedge their position. By inventory date cash wheat has dropped to $1.65, and the option market will theoretically have also decreased five cents to $1.58. Assuming no other transactions have been entered into before in-

ventory date and that none of their wheat has as yet been ground into flour, their inventory valuations would be as follows:

24,000 bushels of wheat owned valued at market of $1.65	$39,600
Unfilled flour sales contracts of 20,000 cwts., requiring 44,000 bu. of wheat, wheat basis in contracts $1.70, market $1.65, or a gain of 5¢ per bu. on 44,000 bu.	2,200
Total of these items	$41,800
Less loss on open options—20,000 bu. of options, bought at $1.63, option market at inventory date $1.58, loss 5¢ per bu. on 20,000 bu.	1,000
Total inventory valuation	$40,800

This amount is the same as the cost of the original 24,000 bushels of wheat at $1.70.

These illustrations show the theory of this method of inventory valuation. In practice, the inventory valuation would probably never exactly equal the original cost, but the difference should not be great enough to be of any particular significance.

Transit Tonnage

One other element of inventory valuations should probably be discussed to some extent. This is the computation of the value for statement purposes of transit tonnage. Under provisions of the railway freight tariffs, it is permissible to ship a carload of grain from, for example, Harper to Wichita, unload the wheat, store it and mill it, and then ship the milled products to Kansas City, and pay for the entire movement from Harper to Kansas City only the through rate on grain and grain products between those points. The shipment, under these transit privileges, may be stopped more than once. For example, a shipment from Larned might be stopped in Hutchinson for storage in a terminal elevator then shipped to Newton for milling and later the flour and feed move to Kansas City, but ultimately for the entire haul the railroad would receive only the through rate for shipments from Larned to Kansas City. In each stage of this shipment the amount paid the railway, however, is that amount which, added to payments already made for any prior part or parts of the movement,

equals the rate from the origin of the movement to the point where the shipment is making a halt, even though later it is to go on to Kansas City.

This transit privilege makes it necessary to compute the value, for inventory purposes, of freight bills which the mills have on hand at an inventory date. These bills represent the freight applicable to stocks of grain or milled products on hand in the mill or elevator, the bills being also available for use on ultimate shipments of such grain or products via Kansas City or any other basic points used in determining freight rates.

Formula for Computation

In our discussion of wheat valuation we pointed out that the price of wheat is based on the Kansas City market price less freight to the mill point. For example, if wheat was $1.87½ in Kansas City, it should be $1.77 in Wichita, since the Wichita-Kansas City freight rate is 17½ cents per hundredweight or 10½ cents per bushel. Now for illustrative purposes, assume those are the figures used in valuing a wheat inventory at Wichita. The mill also has on hand freight bills covering the shipment of this wheat from Harper to Wichita, for which movement the local Harper-Wichita rate of 12½ cents per hundredweight or 7½ cents per bushel had been paid. Under the transit privileges wheat or products of the quantity covered by this freight bill can move from Harper to Kansas City at the through rate between these points of 18½ cents per hundredweight or 11-1/10 cents per bushel. Therefore, when the mill ships such products on to Kansas City, it need only pay the balance of the 18½ cents through rate, or 6 cents, 12½ cents already having been paid for the movement from Harper to Wichita. Because of the large proportion of the through rate already paid for the relatively short haul from Harper to Wichita, the freight bill should have some value assigned to it for inventory purposes. The method of calculating this value produces an amount which, when added to the inventory value of a bushel of wheat valued at Wichita, gives the same total as the total of the wheat valued at Harper plus the actual freight rate from Harper to Wichita.

The value of the tonnage is computed by use of the following formula:

Value = Paid-in rate—(Origin to Kansas City rate—Mill point to Kansas City rate)

or in the case of a flour mill inventory at Wichita of Harper origin tonnage:

Value — 12½—(18½—17½) or 11½¢ per cwt., equivalent to 6-9/10¢ per bushel

	Basis Wichita	*Basis Harper Plus cost to move to Wichita*
Kansas City price	$1.87½	$1.87½
Less freight	.10½	.111
Basis wheat	1.77	1.764
Transit value	.069	
Total wheat in transit, valued basis Wichita	$1.839	
Plus Harper-Wichita rate		.075
Harper wheat basis plus cost to move to Wichita		$1.839

The preceding discussion presents the elements of the theory of flour mill inventory valuations with respect to items whose treatment is distinctive from that in other industries. As mentioned earlier, other inventory items such as flour ingredients, containers, and some other items, are valued at the lower of cost or market, and need no further discussion here.

COMING ARTICLES

In the *N. A. C. A. Bulletin*, May 15, 1947

Steam Accounting
by Robert W. Arentson

Budgets and Budgetary Control
by Paul A. Wilks

Costs in Relation to Production Runs
by Robert E. Staunton

AN INCENTIVE PLAN FOR CHAIN STORES

by R. L. URBAN, Treasurer,
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MOST chains have some kind of incentive plan for their managers. Generally speaking these plans are based on sales alone, on profits alone, or on a combination of factors. It is quite probable, however, that few, if any, of such plans are entirely satisfactory to all concerned. About all that can be expected of such plans is that they be fair to those interested and that they perform the service intended. In order to establish an incentive plan which can be expected to function satisfactorily certain prerequisites are necessary:

1. Adequate accounting system.
2. Preparation periodically of individual store statements in the central office to be mailed immediately to the store managers.
3. These statements should show for period and year to date:
   a. Sales properly classified.
   b. Gross profit.
   c. Amount and percentage of expenses, classified and subtotaled, subject to a manager's control.
   d. Classified expenses over which manager has no control.
   e. Total expense.
   f. Amortization or depreciation charges or other charges necessary to create proper reserves.
   g. Net profit or loss.

In the final analysis, the intent of an incentive plan must be to gain a larger profit for the company through making it worth while for the manager to increase his efforts. Any plan which is not based on this principle is doomed to failure. Too often sales volume is overstressed in an incentive plan. It should be used as a basis for drawing accounts, for it might be said that generally speaking managerial responsibility increases with the increased volume. But before basing remuneration entirely on a flat percentage of sales some questions should be asked, such as how the manager contributes to the volume. Is he responsible for the location? Does he control the advertising? Does he do the buying, or does he sell that which a central purchasing office supplies?

If the improbable answer to all those questions is "yes," there is still the very important question as to whether or not the sales are profitable. Any incentive plan should be so contrived as to help assure profitable sales. However, the objections to a plan based on profits alone are that it does not stress the source of profits but only the accomplishment, and it is difficult to evaluate the incentive if there are no profits.

Factors in Plan

An incentive plan which has been in operation by a specialty chain for approximately five years is a combination plan consisting of four interlocking and interdependent factors. In this chain purchases, advertising, and store locations are a central office function. Managers are responsible for their personnel, store appearance, window displays, care of stock, etc. Selling prices are fixed by the central office. The factors considered in this plan are:

1. Sales volume of the previous year, as a basis for the drawing account.
2. Sales increases against the previous year; on this a percentage payment is made.
3. Controllable expenses; payment for reduction against the previous year and extra payment for holding such expenses below the goal or target.
4. Store profit; payment of a percentage of store profits.

Sales and Sales Increases

In establishing basic drawing accounts, a scale of weekly payments is set up for various sales volumes. The same scale applies to all stores in the chain. The lowest volume in the scale carries a weekly pay which is considered a necessary living wage for one who is capable of assuming managerial responsibilities. Drawing accounts are then scaled upward at a standard rate per week for each additional $25,000 volume. In other words, drawing accounts are on a sliding scale and are based against the previous year's volume. A residual and rather important effect of this scale is to relieve management of the necessity of fixing drawing accounts, which automatically eliminates the twin evils of favoritism and discrimination as far as the base pay for operating any given store is concerned.

The percentage on increased sales serves a dual function. Since the manager's drawing account is based on the previous year's sales, he is compensated for the additional business which he may be doing currently. This is accomplished by a standard percentage on all sales increases. In addition, a further and higher percentage is being given for increasing sales on certain classes of merchandise on which volume increases are especially desired.

Controllable Expenses and Profits

Since drawing accounts are based on volume and since special payments are made for volume increases, it is recognized that there is such a thing as volume without profit. Accordingly, incentive payments and penalties are applied against controllable expenses. It was necessary to establish a percentage goal which the best managed stores had demonstrated to be attainable. This percentage was set up as the target. For each tenth of one per cent by which a manager is able to reduce his controllable expenses against the previous year, he receives X dollars. He is also penalized the same amount for each tenth of one per cent by which he exceeds his controllable expenses of the previous years. When, however, his controllable expenses are less than the goal, he receives 2X dollars for each tenth of one per cent by which he has beaten the target, regardless of whether they are higher or lower than the previous year.

The manager is also paid a percentage of the store profits. No charge is made to the store for central office overhead or income tax and the manager can tell pretty well from period to period not only what the store is doing, but what his own financial gain amounts to.

Illustration—Case 1

Some examples, using hypothetical figures, may better illustrate the plan in operation:

Store sales in 1946, increase over 1945		$31,200
Manager receives 1% of total increase	$312	
Manager receives 3% of $11,000 increase in sales of special merchandise	330	
Bonus for sales increases		$ 642

Since the increase in sales has brought the store volume into the next higher bracket, manager's drawing account for 1947 will be increased $6 per week or $312 per year.

Case 2

Of course, the increased sales in Case 1 should have meant increased profits, adding further to the manager's bonus:

Profit per store statement 1946	$10,000
Bonus on store profits at 5%	$ 500

Case 3

It should be noted that basic drawing accounts may be scaled down as well as up if sales slip into the next lower bracket. Supposing in 1947 sales on this particular store did slip back to the 1945 level. For having had the increase in 1946, the manager received $642 in 1946 and $312 in 1947. In 1948 he is back on the 1945 drawing account, but the store's volume is also back on the 1945 level.

In order to help the manager obtain the increased sales on a profitable basis, he is made conscious of the effect of good or poor expense control:

Controllable expense 1945	14.2%
Controllable expense 1946	13.0
Decrease in Controllable Expense	1.2%
Pay $10 for each 1/10 of 1% reduction to 14.0%	$ 20
Pay $20 for each 1/10 of 1% below the bulls-eye of 14.0%	200
Bonus on Controllable Expense	$220

Note that the reduction of 1.2% in controllable expenses also meant that the manager in addition to the payment of $220 for the accomplishment received 5% of the additional profit procured thereby.

Case 4

Had controllable expenses increased, the manager would have been penalized as follows:

Controllable expense 1945	14.2%
Controllable expense 1946	14.7
Increase in Controllable Expense	0.5%
Deduct from bonus $10 for each 1/10 of 1% increase	$50

Controllable expense penalties are not applied to drawing accounts, but may be offset against any bonus earnings, say on store profits or sales increases. It should be noted that a manager not only may help to hold down his controllable expenses, but further add to his income by selling merchandise on the floor. His controllable expense guide is an indicator as to when he should or should not be selling. If he has too many salesmen, his controllables will rise. Every manager wants increased volume and the natural tendency is to overstaff. The effect of the controllable expense factor is to curb this tendency.

Conclusion

It is understood, of course, that there is considerable flexibility in this plan, since the dollar scale of basic drawing accounts may be changed and brackets may be split up so as to make basic drawing increases or decreases more frequent. Also, the percentage of profit may be changed as well as the percentage for sales increases. And, of course, payment for controllable expense may be set as desired, or the target may be changed.

No incentive plan is perfect and all plans must be reviewed regularly to see if they are performing the services intended. In the particular plan outlined, which the writer originally installed, no fundamental changes have yet been made. It should be recorded, however, that it has been in operation through a period when sales and profits have been increasing. It has yet to be tested in and era of declining sales and profits. The writer feels that any incentive plan which benefits only the company or only the employees is a bad plan. It must provide extra pay for extra benefits received. A plan should be clearly set forth and stated or restated at the beginning of each fiscal year. No plan should be changed in midyear and it is believed inadvisable to change a plan at all if it is operating smoothly and accomplishing its purpose. But it should be reviewed regularly to see that it is accomplishing the purpose intended.